CBSE QUESTION PAPER
CLASS-X
MATHS

SECTION - A

Question 1: $If \sin \alpha = \frac{1}{2}, then\ the\ value\ of\ 4\cos^3\alpha - 3\cos\alpha\ is$

$$(a)0$$
$$(b)1$$
$$(c)-1$$
$$(d)2$$

Question 2: If $\cos 2\theta = \sin(\theta - 12°),$

$where 2\theta\ and\ (\theta - 12°)\ are\ both\ acute\ angles, then\ the\ value\ of\ \theta\ is$

$$(a)24°$$
$$(b)28°$$
$$(c)32°$$
$$(d)34°$$

Question 3: For a given data with 100 observations the 'less than ogive and the more than ogive' intersect at (525, 50). The median of the data is

(a) 520
(b) 525
(c) 500
(d) 225

Question 4: Which of the following is not a rational number?

(a) $\sqrt{3}$

(b) $\sqrt{9}$

(c) $\sqrt{16}$

(d) $\sqrt{25}$

Question 5: If $\tan 2A = \cot(A - 18°)$, Where 2A is an acute angle, then the value of A is

(a) **24°**

(b) **12°**

(c) **36°**

(d) **63°**

Question 6: ΔABC and ΔPQR are similar triangles such that $\angle A = 32°$ and $\angle R = 65°$,

then, $\angle$B is

(a) **83°**

(b) **33°**

(c) **63°**

(d) **93°**

Question 7: If $x = a, y = b$ is the solution of the equations $x + y = 50$

$4x + 5y = 225$, then the values of a and b are respectively.

(a) **10 and 40**

(b) **25 and 25**

(c) **23 and 27**

(d) **20 and 30**

Question 8: In the given data:

Classes	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Frequency	4	5	13	20	14	7	4

The difference between the upper limit of the median class and the lower limit of the modal class is

(a) **0**

(b) **20**

(c) **10**

(d) **30**

Question 9:

If $\sin 5\theta = \cos 4\theta$, where 5θ and 4θ are acute angles, then the value of θ is

(a) $10°$
(b) $100°$
(c) $12°$
(d) $15°$

Question 10: If $\tan\theta = \dfrac{12}{13}$, then the value of $\dfrac{2\sin\theta\cos\theta}{\cos^2\theta - \sin^2\theta}$ is

(a) $\dfrac{307}{25}$

(b) $\dfrac{312}{25}$

(c) $\dfrac{309}{25}$

(d) $\dfrac{316}{25}$

SECTION - B

Question 11: Find the LCM and HCF of 510 and 92 by the prime factorization method.

Question 12: Find the zeroes of the quadratic polynomial $8x^2 - 21 - 22x$ and verify the relationship between the zeroes and the coefficients of the polynomial

Question 13: Solve $37x + 43y = 123, 43x + 37y = 117$

Question 14:

$$\frac{\sqrt{\operatorname{cosec} A - 1}}{\sqrt{\operatorname{cosec} A + 1}} + \frac{\sqrt{\operatorname{cosec} A + 1}}{\sqrt{\operatorname{cosec} A - 1}} = 2\sec A$$

Question 15: In Figure, $DE||BC$ and $BD = CE$. Prove that $\triangle ABC$ is an isosceles triangle.

Question 16: Find the median class and the modal class for the following distribution.

C.I.	$135 - 140$	$140 - 145$	$145 - 150$	$150 - 155$	$155 - 160$	$160 - 165$
f	4	7	18	11	6	5

Question 17: For what value of 'k' will the following pair of linear equations have infinitely many solution.

$$kx + 3y = k - 3$$

$$12x + ky = k$$

Question 18:

Class	0-20	20-40	40-60	60-80
Frequency	15	6	18	10

SECTION - C

Question 19: Prove that $\sqrt{7}$ is an irrational number

OR

Prove that $3 + \sqrt{5}$ is an irrational number

Question 20: Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m.

Question 21: Solve the following pair of equations:

$$\frac{5}{x+y} - \frac{2}{x-y} = -1$$

$$\frac{15}{x+y} + \frac{7}{x-y} = 10$$

OR

Ram travels 760 km to his home, partly by train and partly by car. He takes 8 hours if he travels 160 km by train and the rest by the car. He takes 12 minutes more if he travels 240 km by train and the rest by car. Find the speed of the train and the car separately.

Question 22: If α and β are the zeroes of the quadratic polynomial

Such that α + β = 24 and α − β = 8,

find a quadratic polynomial having α and β as its zeroes

Question 23: In a ∆ABC, P and Q are points on sides AB and AC respectively, such that PQ ∥ BC. If
AP = 2.4 cm, AQ = 2 cm, QC = 3 cm and BC = 6 cm, find AB and PQ.

Question 24:

$$\frac{1+\cos A}{1-\cos A} = (\cot A - \operatorname{cosec} A)^2$$

Question 25:

$$\frac{\tan\theta}{1-\cot\theta} = \frac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$$

Question 26: Find the length of an altitude of an equilateral triangle of side 2 cm.

Question 27: The mean of the following frequency distribution is 62.8. Find the value p.

Classes	0 – 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	5	8	P	12	7	8

OR

Find the mean of the following frequency distribution, using step-deviation method.

classes	25 - 29	30 -34	35 - 39	40 - 44	45 - 49	50 – 54	55 - 59
Frequency	14	22	16	6	5	3	4

Question 28: Find the mode of the following frequency distribution

classes	5 -15	15 - 25	25 – 35	35 - 45	45 - 55	55 - 65	65 - 75
Frequency	2	3	5	7	4	2	2

Question 29: Compute the missing frequencies, x and y in the following data if the mean is $166\frac{9}{26}$ and the sum of the observations is 52.

Classes	Frequency
140-150	5
150-160	X
160-170	20
170-180	Y
180-190	6
190-200	2
Total	52

Now, also calculate the median.

Question 30:

Solve the following system of linear equations graphically: 2x+y-8, 3x-2y=12 Also find the coordinates of the points where the lines meet the z-axis.

Question 31. Prove that the ratio of the areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

OR

State and prove the converse of the following theorem :

In a right triangle, the square of the hypotenuse is equal to the sum of the other two sides.

Question 32:

If the median of the following data is 32.5, find the missing frequencies.

Class interval: 0- 10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70 Total Frequency: f_1, 5, 9, 12, f_2, 3, 2, 40

Question 33:

Prove that in a triangle, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points the other two sides are divided in the same ratio

Or

Prove that in a right angle triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.

Question34:

During. the medical check-up of 35 students of a class, their weights were recorded as follows :

Weight (in Kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type ogive for the given data. Hence, obtain the median weight from the graph and verify the result by using the formula.